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# PATENT ABSTRACTS OF JAPAN

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**G07F 9/10**

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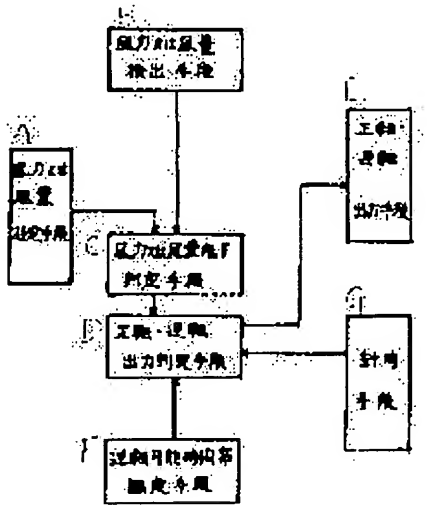
(22)Date of filing : **14.06.1991**

(71)Applicant : **FUJI ELECTRIC CO LTD**
(72)Inventor : **TAKAMATSU EIJI**

## (54) CONTROLLING METHOD FOR COOLING DEVICE TO PREVENT FROM CLOGGING

(57)Abstract:
PURPOSE: To prevent clogging induced by dust and dirt by driving a fan reversely for a specified time when the wind velocity of cooling air of a condenser or its air capacity fails to exceed specified value in a cooling device for automatic vending machines.
CONSTITUTION: A fan of a cooling device which cools a condenser by means of the fan is so arranged that it may rotate reversely. At first, a predetermined value by a window power or air capacity setting means A is compared with a detected value of a wind power or air capacity detection means B by means of an air capacity drop decision means C. When the wind power or air capacity is decided as lower than a specified value, a normal rotation/reverse rotation decision means D outputs a signal, which rotates the fan reversely, to a normal rotation/reverse rotation output means E. The time for reverse rotation is preset by a reverse rotation capability time zone setting means F. The lapse of the specified time is decided by a timer means G so as to return the operation to normal rotation. It is also acceptable that the fan be rotated reversely for every specified time zone or specified operation accumulation time without depending on the drop in the wind power.



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【図9】図4に対応する従来の構成図

【符号の説明】

01　自販機本体
02　庫内
03　モータコンプレーサ（MC）
04　凝縮器
05　制御部
1A　凝縮器用ファン
2　風力（風量）センサ

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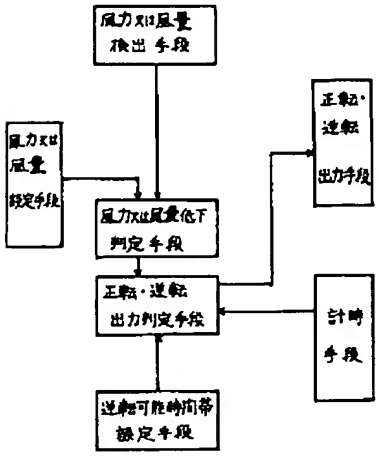
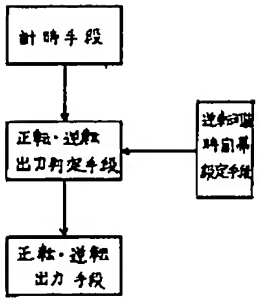
7　タイマ
8　設定装置
9　CPU
10　サーモスイッチ
11　通電センサ
41　正転リレー
41a　正転リレー接点
42　逆転リレー
42a　逆転リレー接点

【図1】

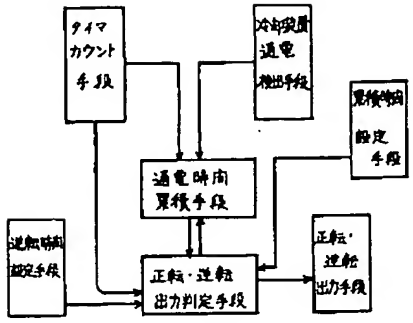



正転：凝縮器冷却用の回転方向
逆転：目詰り防止用の回転方向

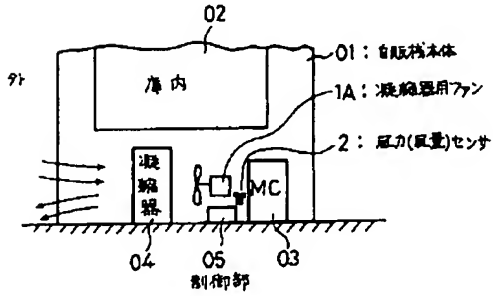
【図2】




【図3】




【図4】

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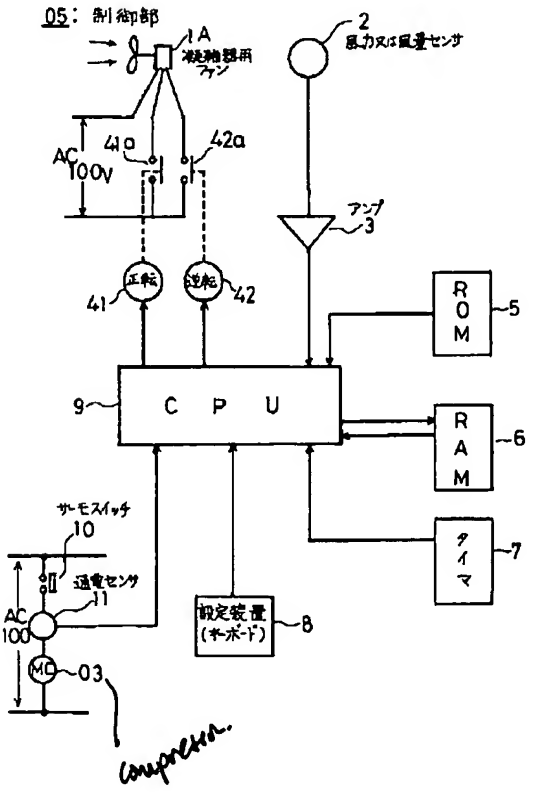




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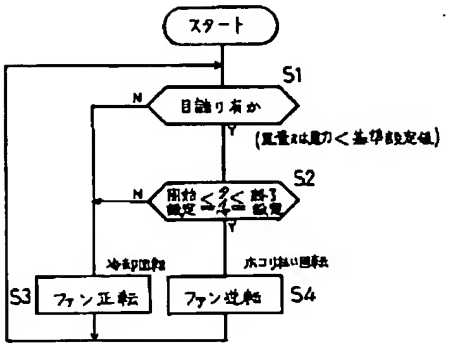
【図6】

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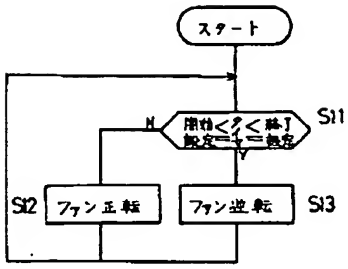
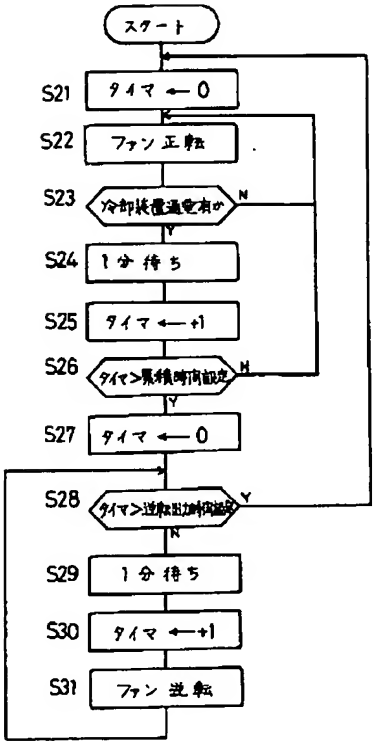
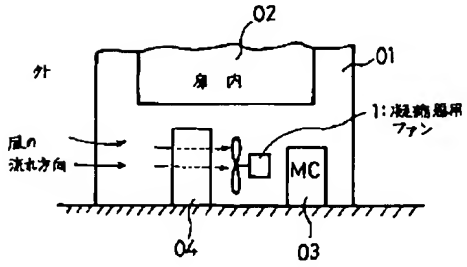



【図8】




【図9】



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(22)出願日　平成３年(1991)６月14日

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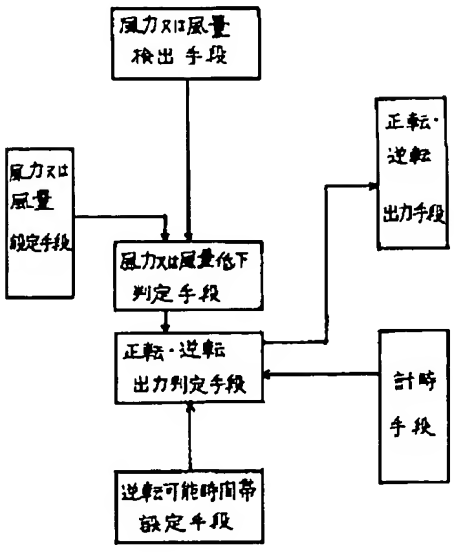
(54)【発明の名称】　冷却装置の目詰まり防止制御方法

(57)【要約】

【目的】自動販売機の庫内を冷却する冷却装置の凝縮器は、自動販売機が屋外に設置される場合が多く、塵埃で目詰まりを起こし易いのでこの問題を解消する。

【構成】凝縮器用冷却ファンを正逆転可能なものとし、凝縮器を通過する風力（風量）が所定値以下に低下した場合、逆転可能な時間帯にある場合、累積運転時間が所定時間を超えた場合等に所定時間、ファンを逆転させ目詰を防ぐ。




正転：凝縮器冷却用の回転方向

逆転：目詰り防止用の回転方向



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【特許請求の範囲】

【請求項1】凝縮器をファンで冷却する冷却装置において、前記ファンを逆転可能なものにすると共に、前記凝縮器の冷却風の風力または風量が所定値以下に低下したときは、所定の時間帯において前記ファンを逆転させるようにしたことを特徴とする冷却装置の目詰まり防止制御方法。

【請求項2】凝縮器をファンで冷却する冷却装置において、前記ファンを逆転可能なものにすると共に、所定の時間帯において前記ファンを逆転させるようにしたことを特徴とする冷却装置の目詰まり防止制御方法。

【請求項3】凝縮器をファンで冷却する冷却装置において、前記ファンを逆転可能なものにすると共に、前記冷却装置の運転累積時間が第1の所定時間に達するごとに第2の所定時間、前記ファンを逆転させるようにしたことを特徴とする冷却装置の目詰まり防止制御方法。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は自動販売機（自販機とも略記する）の庫内等を冷却する冷却装置を構成する冷媒の凝縮器（コンデンサ）の目詰まりを防止する制御方法に関する。なお以下各図において同一の符号は同一もしくは相当部分を示す。

【0002】

【従来の技術】図9はこの種の冷却装置の要部の原理的な構成図である。同図において01は自販機の本体、02は庫内、03は冷媒を圧縮循環させる電動圧縮機（モータコンプレッサ、MCとも略記する）、04は圧縮された高温の冷媒を冷却する熱交換器としての凝縮器、1はこの例では凝縮器04の図外の冷却フィンの間を通して外気を吸込みこの凝縮器04を冷却する凝縮器用ファンである。自販機では通常はこの図のように圧縮器（MC）03と凝縮器04と凝縮器用ファン1はセットで配列されており、このファン1は吸気または排気の一方向に回転している。

【0003】

【発明が解決しようとする課題】自販機は屋外に設置される機会も多く、塵埃に対しては悪条件である。しかも、冷却装置部は吸気または排気を行うため、塵埃が付着し易い。そのため、凝縮器への塵埃による目詰まりが発生し、それに起因してファンの風力（風量）が低下することにより放熱が悪くなり、このことが冷却装置の冷却特性を下げる要因となっている。そこで本発明はこの問題を解消できる冷却装置の目詰まり防止制御方法を提供することを課題とする。

【0004】

【課題を解決するための手段】前記の課題を解決するために、請求項1の目詰まり防止制御方法は、凝縮器（04など）をファン（1Aなど）で冷却する冷却装置において、前記ファンを逆転可能なものにすると共に、（風

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力（風量）センサ2などを介して検出された）前記凝縮器の冷却風の風力または風量が（設定装置8などを介して設定された）所定値以下に低下したときは、（タイマ8などの示す現在時間が設定装置8などを介して設定された）所定の時間帯（である場合）において（CPU9などを介し）前記ファンを逆転させるようにし、

【0005】請求項2の目詰まり防止制御方法は、凝縮器（04など）をファン（1Aなど）で冷却する冷却装置において、前記ファンを逆転可能なものにすると共に、（タイマ8などの示す現在時間が設定装置8などを介して設定された）所定の時間帯（である場合）において（CPU9などを介し）前記ファンを逆転させるようにし、また

【0006】請求項3の目詰まり防止制御方法は、凝縮器（04など）をファン（1Aなど）で冷却する冷却装置において、前記ファンを逆転可能なものにすると共に、（通電センサ11，タイマ7などを介して積算された）前記冷却装置の運転累積時間が（設定装置8などを介して設定された）第1の所定時間に達するごとに（タイマ7などによる積算時間が設定装置8などを介して設定された）第2の所定時間（になる迄）、（CPU9などを介し）前記ファンを逆転させるようにするものとする。

【0007】

【作　用】凝縮器用ファンを正，逆転させる手段を設け、①所定の風力（または風量）低下を検知したとき、②逆転可能な所定の時間帯にあるとき、または③冷却装置の所定の通電累積時間の経過時に所定時間、凝縮器冷却ファンを通常の方向と逆の方向に回転させ、凝縮器に通常回転で付着した塵埃を払い落とし、目詰まりを防止する。なお図1ないし図3は前記①～③の（夫々請求項1～3に関わる）発明に対するクレーム対応図である。

【0008】

【実施例】以下図1ないし図8に基づいて本発明の実施例を説明する。

（1）風力（風量）検知方式（請求項1）：図4は請求項1ないし3に関わる発明の実施例としての機械的構成を示し、この図は図9に対応している。この図4においては図9に対し凝縮器用ファンが正逆転可能なファン1Aに置換わり、このファン1Aの風力（または風量）を検出する風力（風量）センサ2（なおこのセンサは図1の風力または風量検出手段に相当する）およびファン1Aの正逆転を制御する制御部05が新設されている。

【0009】図5は制御部05の回路構成の実施例を示す。1はこの制御部05の主体となるCPU、5，6は夫々このCPUに属するROM，RAMである。41，42は夫々接点41a，42aを介して凝縮器用ファン1Aの正方向（便宜上、冷却回転方向とする），逆方向（目詰まり防止回転方向）の回転を行わせるリレー（なおこのリレーは、図1～図3の正転，逆転出力手段に相



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当する）で、ＣＰＵ９によって制御される。風力（風量）センサ２の検出信号はアンプ３を介してＣＰＵ９に入力される。７はタイマ（なおこのタイマは図１，図２の計時手段および図３のタイマカウント手段に相当する）で、その計時データはＣＰＵ９に入力される。８はキーボードなどからなる設定装置（なおこの設定装置は図１の風力または風量設定手段、図１，図２の逆転可能時間帯設定手段および図３の累計時間設定手段，逆転時間設定手段に相当する）で、目詰まり防止回転を行う際の風力（風量）値や時間帯（開始時刻および終了時刻）等をＣＰＵ９に設定入力するためのものである。モータコンプレッサ（ＭＣ）０３は庫内温度の上，下限を検出して夫々オン，オフするサーモスタットのスイッチ１０によって運転されるが、１１はフォトカプラ等からなりこのＭＣ０３の両端電圧または入力電流を検出してＣＰＵ９に与える通電センサ（なおこのセンサは図３の冷却装置通電検出手段に相当する）である。

【００１０】図６は制御部０５の請求項１に関わる動作を示すフローチャートである。次に図６を説明する。なお以下Ｓ１～Ｓ４の符号は同図中のステップを示す。なおこの場合図５のタイマは時計（例えば２４時間タイマ）であるものとする。ＣＰＵ９はまず、目詰まりであるか否かを風力（風量）センサ２からの入力と設定装置８によるその設定値とを比較することによって判定する（Ｓ１、なおこのステップは図１の風力または風量低下判定手段の機能に相当する）。目詰まり有時には（分岐Ｙ）、次にタイマ７の時刻から、現時刻が予め設定された目詰まり防止回転を行う時間帯（開始時刻から終了時刻までの間）にあるか否かを判定する（Ｓ２、なおこのステップは図１の正転，逆転出力判定手段の機能に相当する）。この判別の結果設定された時間帯であれば（分岐Ｙ）、この時間帯にある間、ファン１Ａの逆転（目詰まり防止回転）を行う（Ｓ４）。またステップＳ１，Ｓ２の条件が揃うまでは（何れも分岐Ｎ）、ＣＰＵ９はファン１Ａの正転（冷却回転）を行う。

【００１１】（２）定期時間方式（請求項２）：図７は図５の制御部０５の請求項２に関わる動作を示すフローチャートである。次に図７を説明する。なお以下Ｓ１１～Ｓ１３の符号は同図中のステップを示す。なおこの場合も図５のタイマは時計（例えば２４時間タイマ）であるものとする。図７においてＣＰＵ９は目詰まり防止回転の時間帯設定値と、タイマ７の現時刻とを比較し（Ｓ１１、なおこのステップは図２の正転，逆転出力判定手段の機能に相当する）、時間帯内であれば（分岐Ｙ）、ファン１Ａの逆転（目詰まり防止回転）をさせ（Ｓ１３）、時間帯外であれば（分岐Ｎ）、正転（冷却回転）をさせる（Ｓ１２）。

【００１２】（３）累積時間方式（請求項３）：図８は図５の制御部０５の請求項３に関わる動作を示すフローチャートである。次に図８を説明する。なおこの場合、

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図５のタイマ７は時間を積算する役割を持ち、ＣＰＵ９は通電センサ１１の出力からＭＣ０３の通電有無を検出し、タイマ７を介して冷却装置の通電時間を累計する。次に図８を説明する。なお以下Ｓ２１～Ｓ３１の符号は同図中のステップを示す。まずＣＰＵ９は冷却装置の通電時間を累積カウントするタイマ７をクリアし（Ｓ２１）、ファン１Ａを正転させる。次に電圧（電流）検知手段１１の出力からＭＣ０３の通電の有／無を判定する（Ｓ２３）。通電があれば（分岐Ｙ）、タイマ７の計時値を例えば１分経過毎に＋１づつ累積して行き（Ｓ２４，Ｓ２５、なおこの２つのステップは図３の通電時間累積手段の機能に相当する）、予め設定装置８によって設定された累積時間設定値に達したか否かを判定する（Ｓ２６）。そしてこの条件が揃うまでは（分岐Ｎ）、ファン１Ａの正転（冷却回転）を行う（Ｓ２２）。前記ステップＳ２６の条件が揃った時（分岐Ｙ）、改めてタイマ７をクリアし（Ｓ２７）、タイマ７を計時値が設定装置８で予め設定された逆転出力時間の設定値（例えば５分）に達するまで（Ｓ２８，分岐Ｎ）、１分ごとにタイマ７の値を＋１づつしていき（Ｓ２９，Ｓ３０）、この間、ファン１Ａを逆転（目詰まり防止回転）させる（Ｓ３１）。なお図３の正転，逆転出力判定手段の機能は前記のステップＳ２６，Ｓ２８に相当する。そしてタイマ７の値が逆転出力時間設定値に達した時（Ｓ２８，分岐Ｙ）、スタート時の正転（冷却回転）に戻る（Ｓ２１，Ｓ２２）。

【００１３】

【発明の効果】本発明によれば凝縮器の冷却ファンを逆転可能なものとし、この冷却ファンの風力（風量）が所定値まで低下したとき、逆転可能な所定時間帯にあるとき、冷却装置の累積運転時間が所定値に達したとき等に、所定時間、冷却ファンを逆転させるようにしたので、ファンの回転を通常の逆回転にすることで風向を変え、凝縮器についた塵埃を払うことができ、凝縮器の目詰まりを軽減することができる。これにより目詰まりによる冷却特性の低下を防ぐことができる。

【図面の簡単な説明】

【図１】請求項１のクレーム対応図

【図２】請求項２のクレーム対応図

【図３】請求項３のクレーム対応図

【図４】請求項１ないし３に関わる発明の実施例としての機械的構造の原理的な構成図

【図５】図４の制御部の回路構成の実施例を示すブロック図

【図６】図５の請求項１に関わる動作を示すフローチャート

【図７】図５の請求項２に関わる動作を示すフローチャート

【図８】図５の請求項３に関わる動作を示すフローチャート



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(54) Title of Invention: Controlling method for cooling device to prevent from clogging.

(57) [Abstract]
[Purpose]
In situations when an automatic vending machine is established outdoors, the condenser of the cooling device that cools the automatic vending machine is easily clogged by dirt and dust. The purpose is to solve this problem.

[Constitution]
The condenser (having a fan that can rotate in both forward and reverse directions), in situations where: air power (the amount of air) passing through the condenser falls below a specified value; or at times that allow for the reverse operation of the cooling fan; or when accumulated rotation time has exceeded a certain set value, the cooling fan is set to reverse to protect against clogging.

[Scope of the claims of the patent]
[Claim 1]
A clogging prevention control method for a cooling device, characterized by: While having that the cooling fan a cooling device (that is used to cool a condenser) can be set to operate in reverse rotation,

said cooling fan is set to reverse for a specified amount of time, when the cooling air power and air amount to the above-noted condenser falls below a specified value.

[Claim 2]
A clogging prevention control method for a cooling device, characterized by: While having that the cooling fan a cooling device (that is used to cool a condenser) can be set to operate in reverse rotation, setting said cooling fan to reverse for a specified amount of time.

[Claim 3]
A clogging prevention control method for a cooling device, characterized by: While having that the cooling fan a cooling device (that is used to cool a condenser) can be set to operate in reverse rotation, each time the accumulated rotational time reaches a specified time value (No.1), said cooling fan is set to reverse for a specified amount of time (No. 2).

[Detailed explanation of the invention]
[0001]
[Areas of application in industry]
This invention relates to a clogging prevention control method for a coolant condenser that constitutes a cooling device that cools the interior of an automatic vending machine (can be abbreviated to 'vending machine'). Furthermore, on each diagram below, identical symbols represent identical, or otherwise suitable parts.

[0002]
[Prior art]
Diagram 9 illustrates the fundamental composition of the essential parts of this kind of cooling device. On the same diagram, 01 represents the vending machine itself, 02 represents the interior of the vending machine, 03 represents the electric compressor ("motor compressor" can be abbreviated to 'MC') that compresses and circulates coolant, 4 represents the condenser, acting as a heat-exchange receptacle that cools the compressed high-temperature coolant. In this example 1 is the condenser-use fan that cools condenser 04 by sucking in outside air via the space of the cooling fan of condenser 4 not shown in the diagram. In a vending machine, usually the compressor (MC) 03, the condenser 04, and the condenser-use fan 1, are arranged in a set. This fan (1) rotates in one direction for inspiration, and one direction for ventilation.

[0003]
[Problems to be solved by the invention]
The chances of a vending machine being established outdoors are high, and as for dealing with dirt and dust, the conditions are unfavorable. However, because the cooling device part carries out both inspiration and ventilation, it is easy for dust and dirt to cling to it. Because of this, clogging of the condenser by dust and dirt occurs, and as a result heat radiation becomes bad because of the lowered air power (amount of air) of the fan. This is the cause of the lowered cooling ability of the cooling device. This invention has the task of providing a clogging prevention control method for a cooling device that can solve this problem.

[0004]
[Means for solving the problem]
For the purpose of solving the above-noted problems, as for the above-noted control method for preventing clogging (of claim 1), on the cooling device that by use of a fan (1A) (that can rotate in both forward and reverse directions) cools the condenser (04), when the cooling air power or amount (detected by air power (the amount of air) sensor 2) to the above-noted condenser falls below a

specified value (a value established by means of the setting device 8), the above-noted fan is set to reverse (by means of CPU 9) in certain situations for a determined period of time (the 'present time' of timer 8 is set by means of setting device 8).

[0005]
In the above-noted control method for preventing clogging (of claim 2), on the cooling device that by use of a fan (1A) (that can rotate in both forward and reverse directions) cools the condenser (04), when the cooling air power or amount (detected by air power (the amount of air) sensor 2) to the above-noted condenser falls below a specified value (a value established by means of the setting device 8), the above-noted fan is set to reverse (by means of CPU 9) in certain situations for a determined period of time (the 'present time' of timer 8 is set by means of setting device 8).
[0006]
Also in the above-noted control method for preventing clogging (of claim 3), on the cooling device that by use of a fan (1A) (that can rotate in both forward and reverse directions) cools the condenser (04), each time (estimated time according to timer 7 is set by means of setting device 8) the accumulated running time (estimated by means of current-flow sensor 11 and timer 7) of the above-noted cooling device exceeds a specified time value (No. 1) (Set by means of setting device 8), the above-noted fan is set to reverse (by means of CPU 9) for a time up until a specified period (No.2).

[0007]
[Operation]
Establishing a condenser-use fan that can be run in both forward and reverse directions, in times when the fall in (1) specified amount of air power (also air quantity) is detected, in times when it is feasible to run the fan in (3) reverse for a set amount of time, Also in times where the set electric current accumulated time of the cooling device exceeds a specified time value, the normal rotational direction of the fan is set to rotate in its reverse direction, and prevents clogging by discarding the dirt and dust that has clung to the condenser during normal rotation. Furthermore, as for diagrams 1 through 3, they correspond to the above-noted claims (1)~(3) that relate to invention.

[0008]
[Embodiments]
Based on diagrams 1 through 8, the embodiments of this invention are explained.
(1) Air power (amount of air) sensing method: Diagram 4 illustrates the mechanical composition of the embodiments of the invention involving claims 1 through 3, this diagram corresponds to diagram 9. , As for on diagram 4, corresponding to diagram 9, condenser-use fan replaces fan 1A (able to rotate in forward and reverse directions). Sensor 2 (which senses the wind power (amount of wind) of this fan 1A), and controller 05 (which controls the forward and reverse rotation of fan 1A) are established. (Furthermore, sensor 2 is also suitable means for sensing the air power and air quantity of diagram 1).

[0009]
Diagram 5 illustrates the embodiment of the circuit composition of controller 05. 1 is the CPU that becomes the main constituent of this controller 05. 5 and 6 are the RAM and ROM belonging to the CPU respectively. 41 and 42 are relays that facilitate the forward rotation (for convenience, the cooling rotational direction) and the revere rotation (the rotation direction for preventing clogging) of the condenser-use fan 1A through the media of connection-points 41a and 42a respectively. (Furthermore these relays are also suitable means for generating the output for the forward and reverse rotational directions of diagrams 1~3.) These relays are controlled according to CPU 9. The detection signal of air power (amount of air) sensor 2 is input to CPU 9 through the media of amp 3. 7 is a timer, and inputs this time-check data to CPU 9 (further, this timer is also suitable time-check means for diagrams 1, and 2; as well as suitable 'timer-count' means for diagram 3). 8 is a setting device

comprised by a keyboard, and its purpose is to input the air power (on the occasion of clogging prevention reverse fan rotation) and time period settings to CPU 9. (Furthermore, this setting device is also suitable setting means for the wind power (and quantity) of diagram 1, and also the time period of rotation on the occasion of feasible reverse rotation of diagrams 1, and 2; And also suitable total-time setting means, as well as reverse-rotation time setting means for diagram 3). Motor compressor 03 (MC) is driven by thermostat switch 10 on or off in correspondence with the high and low temperature limits in the interior. 11 is a current-flow sensor comprised of photo-couplers etc. that senses the voltage (both terminal) and current input of MC 03 and sends it to CPU 9 (further, this current-flow sensor is also suitable current-flow sensing means for the cooling device of diagram 3).

[0010]
Diagram 6 is a flowchart that illustrates the behavior of controller 5 that involves claim 1. Next diagram 6 will be explained. Further, the symbols S1~S4 illustrate steps based in the same diagram. Further, in this case, have that the timer of diagram 5 (for instance, a 24 hour timer) is a time-check device. First, CPU 9 decides whether or not clogging is taking place by comparing the input from air power (amount of air) sensor 2, and the setting value of setting device (S1, furthermore, this step is also suitable means as a falling air power and air quantity judging function for diagram 1). As for on times when there is clogging (Junction Y), it is judged whether or not the present time is in the time zone (the period of time from the start to the end of the time zone) of clogging-prevention rotation that was set beforehand by the time of timer 7 (S2, furthermore, this step is also suitable means as a function for judging for forward or reverse rotation situations on diagram 1). If the result of the judgment finds that the present time is on the pre-set time zone (Junction Y), reverse rotation (Clogging prevention rotation direction) of fan 1A will be carried out through out this time (S4). Also, until the conditions of S1, S2 become equal (Junction N), CPU 9 will carry out the forward rotation of fan 1A (Cooling-use rotation direction).

[0011]
(2) Fixed-term time method (Claim 2): Diagram 7 is a flowchart illustrating the behavior of controller 5 (of diagram 5) that involves claim 2. Next, diagram 7 will be explained. Furthermore, the symbols below, S11~S13, illustrate steps based in the same diagram. Further, in this case also, have that the timer of diagram 5 (for instance, a 24 hour timer) is a time-check device. On diagram 7, CPU 9 compares (S11, Further, this step is also suitable means as a function for judging for forward or reverse direction in diagram 2) the setting value at the time of clogging-prevention rotation, and the present time of timer 7; if the present time is inside of the range of the time zone (Junction Y), it carries out the reverse rotation (Clogging prevention rotation direction) of fan 1A; it the present time is outside of the range of the time zone (Junction N), it carries out the forward rotation (Cooling-use rotation direction) of fan 1A (S12).

[0012]
(3) Accumulation time method (Claim 3): Diagram 8 is a flowchart illustrating the behavior of controller 5 (of diagram 5) that involves claim 3. Next diagram 8 will be explained. Furthermore, in this case timer 7 of diagram 5 holds the role of adding up time. CPU 9 detects whether MC 03 has current-flow or not by the output of current-flow sensor 11, and through timer 7, totals the current-flow time of the cooling device. Furthermore, the symbols below, S21~S31, illustrate steps based in the same diagram. First, CPU 9 clears (S21) timer 7 (the timer that counts/accumulates the current-flow time of the cooling device), and then carries out the forward rotation of fan 1A. Next, it decides whether MC 03 has current-flow or not (S23) by the output of voltage monitoring means 11. If there is current-flow (Junction Y), it then decides (S26) whether or not it has reached the accumulated time setting value (set in advance by setting device 8) or not by timer 7's time-check value (for instance accumulated as +1 per each minute of time passage) (S24, S25, Further, these 2 steps are also suitable

means as current-flow time accumulation functions for diagram 3). Then until the conditions become equal (junction N), the forward rotation (Cooling-use rotational direction) of fan 1A is carried out (S22). At the time when the conditions of the above-noted step S26 have become equal (Junction Y), timer 7 is cleared once more (S27). Now until (S28, Junction N) the time-check value reaches the reverse rotational output setting value (for instance, 5 minutes) set in advance by setting device 8, the time-check value of timer 7 is accumulated as +1 per each minute of time passage (S29, S30), and during this time, reverse rotation (Rotational direction for the prevention of clogging) of fan 1A is carried out (S31). Further, as for the function of the forward and reverse rotational output judging of diagram 3, Steps S26 and S28 are suitable means. Now, when (S28, Y junction) the time-check value of timer 7 reaches the reverse rotational output setting value, it returns to the forward fan rotation (Cooling-use rotational direction) of 'start-time' (S21, S22).

[0013]
[Effects of the invention]
According to this invention, it is possible to reduce the clogging of the condenser. This is accomplished with a cooling fan (of the condenser) that can rotate in reverse. And the rotation of this fan is switched to reverse when; the air power of the fan falls below a certain set value; or in times when it is feasible to run the fan in reverse direction for a period of time; or when the accumulated run time of the cooling device reaches a certain set value. Now when the direction of the cooling fan is reversed, the air direction is changed, and it is now possible to blow loose the dirt or dust that has clung to the condenser over the time the fan performed cooling blowing in its normal direction. By doing this, this invention prevents the lowering of effectiveness of the cooling device due to clogging.

[Simple explanation of the diagrams]

[Diagram 1]: A diagram corresponding to claim 1
[Diagram 2]: A diagram corresponding to claim 2
[Diagram 3]: A diagram corresponding to claim 3
[Diagram 4]: A fundamental composition diagram illustrating the mechanical structure of the embodiments of this invention that relate to claims 1 through 3.
[Diagram 5]: A block diagram illustrating the embodiment of the circuit structure of the controller of diagram 4.
[Diagram 6]: A flowchart illustrating the behavior that involves claim 1 of diagram 5.
[Diagram 7]: A flowchart illustrating the behavior that involves claim 2 of diagram 5.
[Diagram 8]: A flowchart illustrating the behavior that involves claim 3 of diagram 5.
[Diagram 9]: A composition diagram of 'prior' technology, corresponds to diagram 4.

[Explanation of symbols]

01----------Vending machine itself
02----------Interior of vending machine
03----------Motor compressor (MC)
04----------Condenser
05----------Controller
1A----------Condenser-use fan
2----------Air power (amount of air) sensor
7----------Timer
8----------Setting device
9----------CPU
10----------Thermo-switch

11----------current-flow sensor
41----------forward rotation relay
41a----------connection point of forward rotation relay
42----------reverse rotation relay
42a----------connection point of reverse rotation relay

Diagram 1

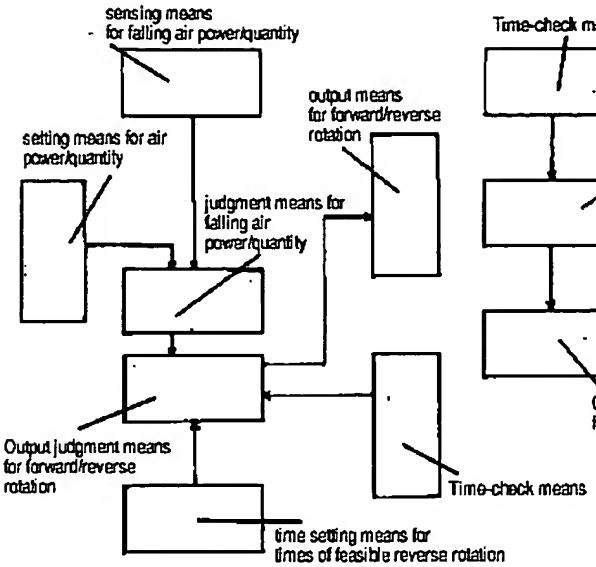



Diagram 2

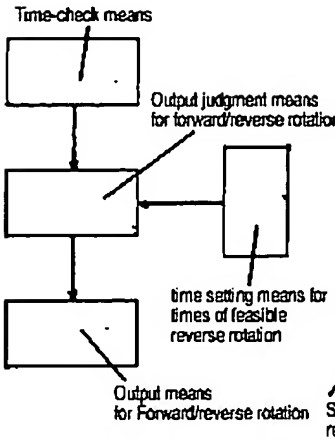
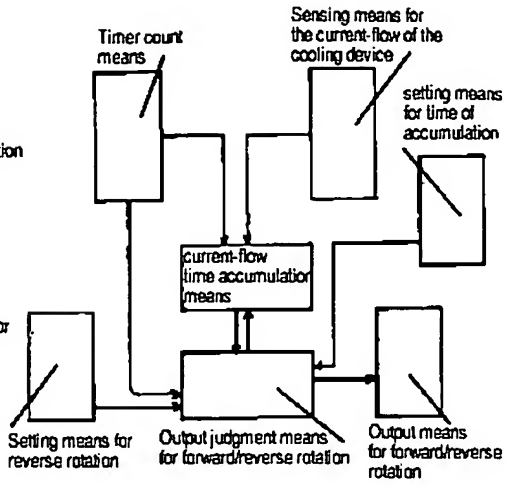



Diagram 3




Forward rotation: the rotation direction that is used for cooling
Reverse rotation: the rotation direction that prevents clogging

Diagram 4

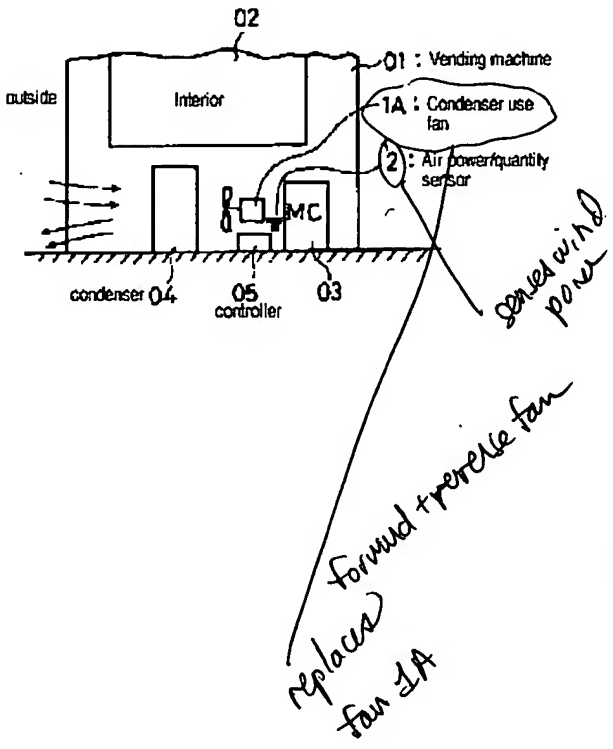



Diagram 5

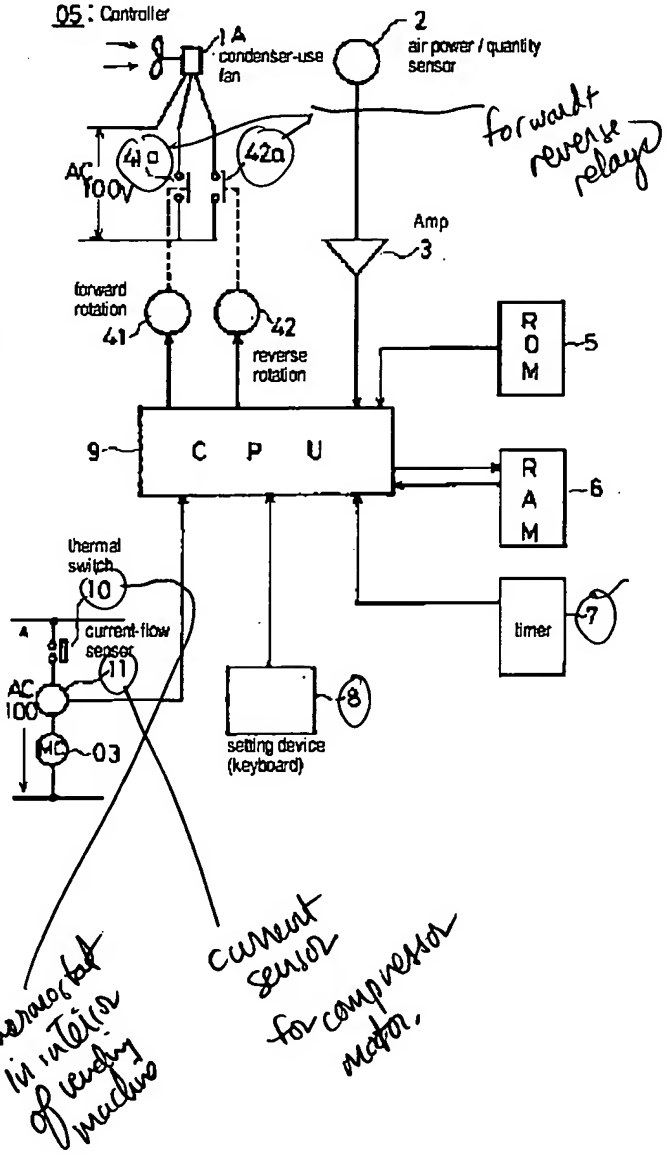


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Diagram 6

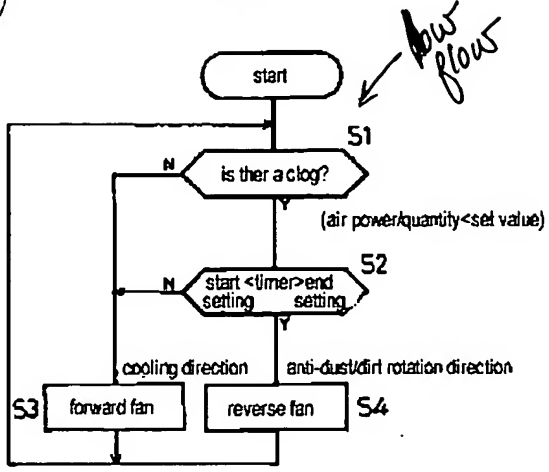



Diagram 7

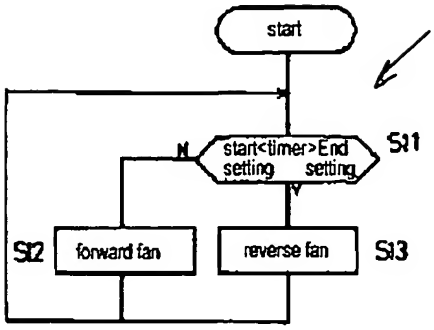



Diagram 8

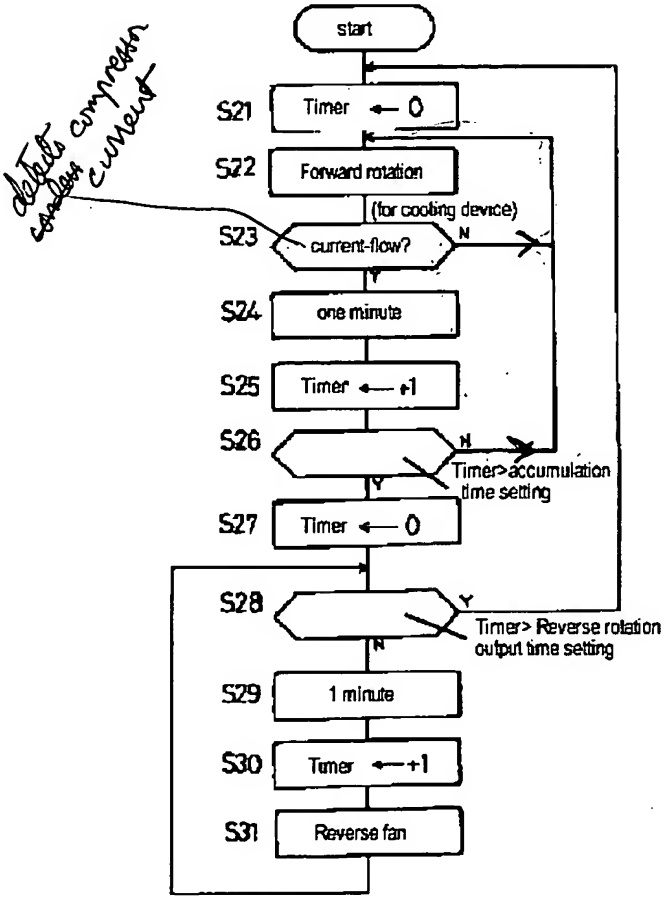
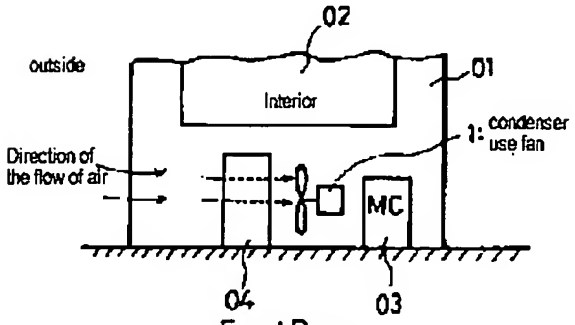



Diagram 9

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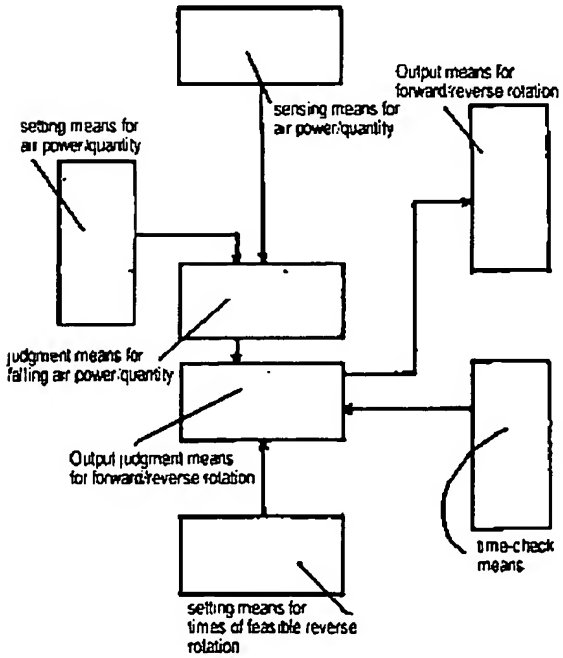


Forward rotation: the rotational direction for cooling
Reverse rotation: the rotational direction for clog prevention